Career-Technical Credit Transfer (CT)²
Welding Technology Career-Technical Assurance Guide (CTAG)
June 24, 2019

The following courses, indicated by Career-Technical Articulation Numbers (CTANs), are eligible for post-secondary credit and transfer among Ohio's public secondary career-technical institutions and state institutions of higher education. The SCTAI alignment document with ODE competencies and post-secondary learning outcomes is available on the ODHE website at https://www.ohiohighered.org/sctai/ctags.

CTW007 Oxy-Fuel Welding and Cutting	**Credits: 3 Semester Hours**
Advising Notes: To earn post-secondary college credit for this CTAN, students must: • Matriculate to an institution of higher education within 3 years of completing the approved program. • Successfully complete the **ODE course Welding Technologies 176009**. • Earn a passing score on the end of course exam combined with the required performance based assessment. The score will be determined at the conclusion of field-testing at the end of the 2019-2020 academic year.	Secondary institutions must have pathway approval from the Ohio Department of Education. Certificate of Affirmation assurances are now incorporated into the CTE-26 application process.
CTW008 Shielded Metal Arc Welding SMAW (STICK)	**Credits: 3 Semester Hours**
Advising Notes: To earn post-secondary college credit for this CTAN, students must: • Matriculate to an institution of higher education within 3 years of completing the approved program. • Successfully complete the **ODE course SMAW (STICK) 176001**. • Earn a passing score on the end of course exam combined with the required performance based assessment. The score will be determined at the conclusion of field-testing at the end of the 2019-2020 academic year.	Secondary institutions must have pathway approval from the Ohio Department of Education. Certificate of Affirmation assurances are now incorporated into the CTE-26 application process.
CTW009 Gas Metal Arc Welding GMAW (MIG)	**Credits: 3 Semester Hours**
Advising Notes: To earn post-secondary college credit for this CTAN, students must: • Matriculate to an institution of higher education within 3 years of completing the approved program. • Successfully complete the **ODE course GMAW (MIG) 176000**. • Earn a passing score on the end of course exam combined with the required performance based assessment. The score will be determined at the conclusion of field-testing at the end of the 2019-2020 academic year.	Secondary institutions must have pathway approval from the Ohio Department of Education. Certificate of Affirmation assurances are now incorporated into the CTE-26 application process.
CTW010 Gas Tungsten Arc Welding GTAW (TIG)	**Credits: 3 Semester Hours**
Advising Notes: To earn post-secondary college credit for this CTAN, students must: • Matriculate to an institution of higher education within 3 years of completing the approved program. • Successfully complete the **ODE course GTAW (TIG) 176003**.	Secondary institutions must have pathway approval from the Ohio Department of Education. Certificate of Affirmation assurances are now incorporated into the CTE-26 application process.

• Earn a passing score on the end of course exam combined with the required performance based assessment. The score will be determined at the conclusion of field-testing at the end of the 2019-2020 academic year.	

Each CTAN identifies the learning outcomes that are equivalent or common in introductory technical courses. Students may receive credit under these agreements when the career-technical programs and the state institutions of higher education document that their course content matches the learning outcomes in the CTANs.

Requirements and Credit Conditions:

1. The receiving institution must have a comparable program, major, or courses for the CTANs listed in this document.
2. Credits apply to courses in the specified technical area at Ohio's public institutions of higher education, provided the institution offers courses in the technical area. In the absence of an equivalent course, and when the institution offers the technical program, the receiving institution will guarantee to grant and apply an equivalent credit value of the Career-Technical Articulation Number (CTAN) toward the technical requirements of the specific degree/certificate program.
3. The applicant must provide proof to the receiving institution that she/he completed a course that has been approved through the $(CT)^2$ approval process and has passed the end-of-program assessment and earning a passing grade on the portfolio.
4. A career-technical student seeking credit under the terms of this CTAG must apply and submit their verification form to the college within three years of completing a career-technical education course.
5. A career-technical student who meets all eligibility criteria will receive the credit hour value for the comparable course as offered at the receiving state institution of higher education.
6. The admission requirements of individual institutions and/or programs are unaffected by the implementation of $(CT)^2$ outcomes.
7. The transfer of credit through this CTAG will not exempt a student from the residency requirements at the receiving institution.

CTW007 Oxy-fuel Welding and Cutting **Credits: 3 Semester Hours**

General Course Description: This course covers the basic theories and practices of oxyacetylene gas welding, cutting, and brazing, and types of welding equipment and operational safety issues. Welding equipment design, use, care, and maintenance are emphasized. Oxy-Fuel laboratory work will include fusion welding, brazing, and manual and semiautomatic cutting.

Credits: 3 Semester Hour

Learning Outcomes marked with an asterisk are essential.

Learning Outcomes:

1. *Identify and describe proper personal protective equipment (PPE) and clothing. Identify, describe, and demonstrate proper use of general safety equipment in the lab.
2. *Describe the basic theories behind oxyacetylene gas welding.
3. *Assemble, test, light, adjust, and disassemble an oxy-fuel system.
4. *Make welds on outside corner joints, butt joints, lap joints, and tee joints in the 1F and 1G positions.
5. **Demonstrate an ability to set up and use manual oxy-fuel gas cutting and machine oxy-fuel gas cutting equipment. Demonstrate an ability to set up and use oxyacetylene welding equipment.
6. *Complete minor repairs to welding equipment and accessories.
7. *Set up plasma arc cutting systems.

CTW008 Shielded Metal Arc Welding SMAW (STICK) **Credits: 3 Semester Hours**

General Course Description: This course introduces the learner to the welding profession, welding tools, welding safety, Oxy-Fuel setup, cutting, and heating, base metal preparation, weld quality, and several aspects of Shielded Metal Arc Welding (SMAW) (known as "Stick Welding") including equipment setup, and basic electrode selection. Through this course, the learner will be able to assess what other welding skills and knowledge they desire and/or need for the workplace.

Credits: 3 Semester Hours

Learning Outcomes marked with an asterisk are essential.

Learning Outcomes:

1. *Discuss theoretic aspects of Shielded Metal Arc Welding.
2. *Demonstrate Welding Safety.
3. *Demonstrate Welding Skills.
4. *Discuss job skills that will help ensure that a welder will be a more valuable employee.

CTW009 Gas Metal Arc Welding GMAW (MIG) **Credits: 3 Semester Hours**

General Course Description: This course introduces the learner to additional welding symbols and drawings, all aspects of Gas Metal Arc Welding (GMAW) and Flux Cored Arc Welding (FCAW), including equipment set-up, gas selection, usage of both solid core, flus core welding wire, using both fillet, and multiple-pass welds. Through this course, the learner will be able to assess what other welding skills and knowledge they desire and need for the various trades in the workforce. The learner will engage in lab projects joining metals in Lap, Tee, Butt, and V-groove configurations using gas-shielded (GMAW) and flux core (FCAW) methods and materials.

Credits: 3 Semester Hours

Learning Outcomes marked with an asterisk are essential.

Learning Outcomes:

1. *Identify and describe proper personal protective equipment (PPE) and clothing. Identify, describe, and demonstrate proper use of general safety equipment in the lab or shop environment.
2. *Set up GMAW equipment for plate, tee joint, lap joint, outside corner joint, square butt, and vee groove welds in the 1F and 1G welding positions.
3. *Set up FACW equipment for plate, tee joint, lap joint, outside corner joint, square butt, and vee grove welds in the 1F and 1G welding positions with FACW as assigned.
4. *Define basic terminology associated with welding metallurgy such as preheat, post-heat, and cooling rate. A grasp of the basic concepts of how the heat affected zone affects the mechanical properties of metal and a respect for the needs for compliance with welding procedures and specifications.
5. *Describe the effect of carbon and alloy content (carbon equivalent) has on the weld-ability of steel.
6. *List the various steps included in common procedures and specifications to accommodate the ease or difficulty with which various metals can be welded.
7. *Interpret basic welding and nondestructive testing symbols.
8. *Explain the importance of testing and inspections of welds.
9. *Explain the difference between a discontinuity and a defect and the description of various discontinuities and defects as well as ways to correct and prevent them.

CTW010 Gas Tungsten Arc Welding GTAW (TIG) | **Credits: 3 Semester Hours**

General Course Description: This course covers the basic principles and practices of gas tungsten arc welding (GTAW). Laboratory work involves the application of GTAW as it is used in industry today. Use of various metal transfer modes for aluminum, carbon steel, and stainless steel, joint styles, welding positions, and manipulation techniques will be emphasized. Welding equipment, design, use, care, safety, and maintenance are emphasized.

Credits: 3 Semester Hours

Learning Outcomes marked with an asterisk are essential.

Learning Outcomes:

1. *Describe the basic theories and practices involving gas tungsten arc welding (GTAW),
2. *Demonstrate safety practices and discuss the importance of paying attention to safety issues. Perform safety inspections of welding equipment and accessories.
3. *Complete minor repairs to welding equipment and accessories.
4. *Make welds on outside corner joints, butt joints, lap joints, tee joints in the 1F and 1G positions for mild steel.
5. *Set up and use gas tungsten arc welding equipment.

FACULTY PARTICIPANTS

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